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# MASTER PLAN

# FOR

# OWEN SOWERWINE NATURAL AREA

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Prepared Jointly by

The Department of State Lands

and

The Flathead County Park Board

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# FOREWORD

In governing and managing this "Natural Area" we should keep before us at all times the definition of "natural": BEING IN ACCORDANCE WITH OR DETERMINED BY NATURE. Inherent in this definition is the implied requirement of us as managers to keep the heavy hand of man as much out of the management as possible, and to proceed as carefully and thoughtfully as possible.

Let us consider some basic facts: Our planet earth was 4.6 billion years in its creation. Life commenced on earth 3 billion years ago and evolved naturally throughout this awesome period of time to bring us to the present. Of this 3 billion years of evolutionary time, our own species has occupied only the last 3 million years, or in other words only one thousandth of the total period of life on earth. Throughout his 3 million years, man lived entirely within his natural environment until only about 3,000 years ago, at which time he began to make use of written languages and to move outside of his natural existence.

Even so, this so-called historic period has occupied only about one thousandth of man's time on earth, and only one millionth of the total period of general life on earth. Even during this last 3,000 years of man's life on earth he lived reasonably close to nature until only about the last 100 years, at which time he began an extravagant and unsustainable burning of fossil fuels to produce energy which in turn was used to alter the face of the earth with reckless abandon. As a result of man's sudden access to power and his voracious and thoughtless behavior during this most recent tiny instant of his existence, almost nothing completely natural remains in areas within his easy reach. Hence the urgent need for the setting aside of representative "Natural Areas" before it is too late.

It seems absolutely mandatory that the role of manager should be one of maintaining the integrity of natural areas until such time as our species has been forced to acquaint itself with the shortsightedness and wastefulness of much of its recent behavior, and finds itself with the knowledge and the inclination to assume a proper and sustainable role as only one of a million species of life on earth.

In other words, the only way we can keep all options open with regard to the future of our "Natural Area" is to keep it as natural as we possibly can, for as long as we possibly can. If not, we very soon will have lost this unique opportunity forever.

by: Mr. Sam Bibler

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*OWEN SOWERWINE NATURAL AREA DEDICATION*

*Owen Sowerwine was the first chairman of the Flathead County Parks Board, serving in this capacity from March, 1974 to his death in January, 1975. A list of his valuable services to our community would be too lengthy to describe here.*

*Because Owen was an active outdoorsman and a thoughtful conservationist of great vision and foresight, he was appreciative of the concepts embodied in the Natural Areas Act of 1974. From the time the specific natural area now under consideration was first proposed, Owen was an ardent advocate.*

*It seems to the current County Park Board that it would be altogether fitting, therefore, that this proposed natural area be named the OWEN SOWERWINE NATURAL AREA, a dedication in tribute.*

MONTANA DEPARTMENT OF STATE LANDS

NATURAL AREA MANAGEMENT AGREEMENT

THIS AGREEMENT, entered into between the Department of State Lands; hereinafter referred to as the "Department"; and The Flathead County Park Board; hereinafter referred to as the "Managing Entity"; do mutually covenant and agree to the terms and conditions as are set forth herein:

WITNESSETH:

1. The Managing Entity does hereby agree to accept the management responsibility for the following described Natural Area:

   Name: Owen Sowerwine Natural Area

   County: Flathead Acres: 442.22

   Legal Description - Township 28 North, Range 21 West, Section 16 (Montana Principal Meridian).

   Subdivisions - NE¼; E½NW¼; W½SE¼; SE¼SW¼; N½NW¼NE¼SW¼; E½NE¼SW¼: S½S½SW¼NE¼SW¼; and Lots 1 and 2.

   Hereinafter referred to as the "Natural Area" or "area".

2. The Managing Entity shall recognize and uphold the following primary duties:

   A. Maintain the integrity of the Natural Area, and retain as nearly as possible all of the natural attributes of the site; and

B. Assure that the Master Plan, which is hereto affixed and made a part of this Agreement, is fulfilled in its entirety.

3. The Managing Entity shall designate a responsible party from within their employ as the Principal Manager of the Natural Area. The Department shall be notified of the name and address of the Principal Manager, and of all personnel changes which occur in this position throughout the duration of this Agreement.

4. Annual Status Reports shall be completed by the Managing Entity for Submission to the Department on or before the anniversary date of this Agreement. Such reports shall include the following:

   A. A brief summary of the beneficial and adverse trends in the natural character of the area, the preceding and projected visitor use which the area is experiencing, and physical threats to the area's natural integrity;

   B. Copies of all permits which were issued for organized group use of the area, for the collecting of samples from the area, and for the installation of environmental monitoring devices on the area, as well as copies of all research projects and studies conducted on the area;

   C. Recommended amendments to the Master Plan which would enhance the protection and use of the Natural Area. Suggested additions to the area which would help alleviate management problems, ensure the long term viability of the area, or general increase the Natural Area values or benefits which could be realized from the area;

   D. Recommendations to eliminate or reduce the danger of potential public injury hazards;

E. Copies of all press releases, news articles, and other informational materials concerning the Natural Area; and

F. All other information pertaining to the Management of the Natural Area which the Department may request.

5. No user, or admission fee may be charged to visitors of the area by the Managing Entity solely for the purpose of entering on, or enjoying the features of the Natural Area. However, the Managing Entity may recover its management costs for services rendered in the exercise of this Agreement by accepting gifts or assessing fees when expenses are specifically incurred for the production of maps, interpretive nature guides, on-site guided studies, or any other materials or services provided which are designed to promote the harmonious use of the Natural Area.

6. This Agreement does not imply nor express a transfer or conveyance of claim to any of the physical resources of the real property comprising the Natural Area. Hence, the Managing Entity has no authority to, and may not, consume for its own purposes any physical estate in the property, nor transfer or dispose of same to a third party.

7. This Agreement, including all responsibilities described herein, may not be assigned nor transferred, in whole or part, to a third party not within the employ of the respective parties hereto. However, this Agreement shall extend to and be binding upon all parties who are designated in accordance with this Agreement.

8. The Managing Entity agrees not to maintain an attractive nuisance on the Natural Area which could endanger the visiting public. Further, the Managing Entity agrees to save harmless the Department for all

liabilities which may arise from a negligent failure to identify potential public injury hazards and to properly warn the public of same.

9. This Agreement shall become effective on the date that both parties so execute, and will remain in effect until such time as either party has given thirty (30) days written notice to the other party expressing a desire to cancel the Agreement; or unless both parties mutually agree to dissolve the Agreement; or the Department elects to dissolve the Agreement in the interest of the maintenance and protection of the Natural Area and so notifies the Managing Entity.

IN WITNESS WHEREOF, the Department of State Lands and the Flathead County Park Board have entered into, and are the parties of this Agreement, and the Commissioner of State Lands, pursuant to the authority granted him by the Board of Land Commissioners, has hereunto set his hand,

_____ _____

Leo Berry, Jr., Commissioner
Department of State Lands

Date

_____ _____

Arnold Jacobsen, President
Flathead County Park Board

Date

## Natural Area Brief

Owen Sowerwine Natural Area

### Location

Flathead County, Montana, one-half (½) mile east of the city of Kalispell.

### Size

Four-hundred forty-two and twenty-two hundredths acres (442.22) consisting of the NE¼; E½NW¼; W½SE¼; SE¼SW¼; N½NW¼; NE¼SW¼; E½NE¼SW¼; S½S½SW¼NE¼SW¼; Lots 1 and 2, Section 16, TWP. 28N, RGE. 21W (M.P.M.).

### Ownership/Administration

State/Department of State Lands.

### Managing Entity/Manager

Flathead County Park Board/Mr. Vern Mauritsen (Superintendent). 723 Fifth Avenue East, Kalispell, Montana, phone 755-5300.

### Access

Public road and boat access designated to area.

### Landform

Large island and two navigable rivers; elevation range 2,890 - 2,900 feet; located in the broad, glaciated Flathead Valley.

### Principal Features

Aquatic - significant stretches of both the Flathead and Stillwater Rivers are included in the area. The entire area lies within the floodplain, and the water table is normally found within 2 - 6 of the ground surface.

Forest - S.A.F. forest cover type 222: Black Cottonwood - Willow; Montana forest habitat type: Picea/Equisetum Aruense; a dense forest dominated by black cottonwood, but including several other occasional species, covers 90% of the area.

Zoologic - Both game and nongame animal species are abundant on the area. Migratory waterfowl, fur bearers, deer, grouse and several other bird species are common throughout the Natural Area.

Grass and Shrubland - A thick undergrowth of shrub species is common on the island Natural Area. The wide variety of species including alder, hawthorne, chokecherry and rose provide excellent cover and browse for wildlife.

Special or Unique Features

The Natural Area serves as a refuge for a number of great Blue Herron, which are threatened locally due to habitat destruction.

Other Features

Geologic - River deposited alluvium, over the glacial drift common in much of Northwestern Montana, characterizes this valley floor Natural Area.

Condition

Primarily undisturbed area. Water quality of the Stillwater River is very good, and the waters of the Flathead River are in excellent condition. A small portion of the area has been grazed intensively by domestic livestock, and firewood has been taken from the area as late as 1958. A powerline is maintained on 1.84 acres of the Natural Area. Seven-hundred thousand (700,000) board feet of Ponderosa pine was removed from the island between 1916 and 1919.

Natural Area Theme

The Black Cottonwood-Willow forest of the Owen Sowerwine Natural Area, as the only protected site of this forest type in western Montana; and the sanctuary the area provides for the great Blue Herron, a threatened species locally, are the principal natural values of this area. The close proximity of the Natural Area to the city of Kalispell is an invaluable asset for educational purposes and allows local citizens the rare privilege of enjoying a wildland experience with convenience. The area is preserved to maintain Montana's natural diversity and is established for the benefit of education and research, as well as the enjoyment of the general public.

## Contributors

Nominating Party: Mr. Vernon Mauritsen, Superintendent,
Flathead County Park Board

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### Governor's Natural Areas Advisory Council

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Right-of-Way Deed No. D-4074 - Figure 2
Water Quality Analyses - Figure 3

Soil Survey Series of Upper Flathead Valley Area, Montana - Extract 1
Forest Habitat Type Description - Extract 2

Soil Series - Map 1
Floodplain Location - Map 2
General Vegetation - Map 3
Flathead County Geology - Map 4
U.S.G.S. Topographic Quadrangle - Map 5
Management Map (in pocket) - Map 6

1. Theme

Owen Sowerwine Natural Area receives its character primarily from the forces of nature; the visual aspects of human intrusion on the area are virtually nonexistent. The value of the area is derived from its geologically significant formation at the confluence of two important waterways of the Northern Rocky Mountains, the Flathead and Stillwater Rivers; and in its botanical communities of dense forest and shrubland; as well as a zoological importance for aquatic life and game and nongame animals.

The purpose of this Natural Area is to provide an active and uninhibited ecological preserve for native species of vegetation and wildlife to evolve as they may, without man's alteration of the land or water which supports them. The value of this area to man, in addition to the maintenance of ecological diversity, lies in the growth and knowledge which he is able to derive from the conscious observation of natural phenomena. These observations may be calculated as those of a trained researcher; casual, for the enjoyment of a walk-through visitor; or interpretive, for the education of small groups. Regardless of the form of these observations, all men are visitors to this area, and their presence must be unobtrusive, without enduring impact.

The following Master Plan attempts to insure the success of the area's twofold purpose of protection with use. However, by necessity, the perpetual integrity of the Natural Area will be maintained only if the visiting public shares in the responsibility to protect the area through diligent stewardship. On the premise that we do in fact visit this area on its terms, with a sincere regard and respect for all of its intrinsic values, we may expect to offer future generations the enjoyment which this wild and intriguing Natural Area provides.

2. Location

Owen Sowerwine Natural Area is an area of land and water in Flathead

County, Montana. The Flathead and Stillwater Rivers flow through the Natural Area. The major land area consists of an island between these waterways. The area is located approximately one-half (½) of a mile east of the City of Kalispell. The legal boundaries of the area are described as follows:

The NE¼; E½NW¼; W½SW¼; SE¼SW¼; N½NW¼NE¼SW¼; E½NE¼SW¼; S½S½SW¼NE¼SW¼; Lots 1 and 2, Section 16, Township 28 North, Range 21 West (Montana Principal Meridian), totaling 442.22 acres, more or less (Appendix, map 6).

Latitude of the area is 48° 08' North and Longitude is 114° 16' West. The elevation range is 2,890 feet to 2,900 feet. Geographically, the area is west of the Continental Divide in the broad Flathead Valley within Montana's Northwest Montana Region.

3. Character

3.1 General Characteristics and Environmental Intrusions:

The most striking feature of the area is the dense forest and brush vegetation which limits views to within a few feet and provides shelter for numerous species of wildlife. Natural debris from annual floods can be found along the flanks of the area, and the banks of the island have been eroded in many places in excess of ten (10) feet above normal water levels. The general topography of the island and surrounding lands is the result of repeated meanderings by the adjacent rivers. A braided pattern of waterways exists throughout the immediate area. Abandoned river channels, a system of islands, and periodic sandbars characterize the active nature of the forces shaping this Natural Area (Appendix, map 5). These factors combine to give the visitor an opportunity to seek solitude along the numerous wildlife trails traversing the area, and likewise, may cause the individual who does not choose his route carefully to lose his original bearings.

The environmental intrusions which the area has experienced are minimal. Timber was periodically harvested from the area for a period of twenty-six (26) years,

between 1915 and 1941, but evidence of this activity is scarce. Mineral permits were granted on the area until 1939, but there is no indication that they were exercised. A portion of the area is presently used as grazing land (Appendix, figure 1). Approximately 1.84 acres in the E½NW¼ is subject to a fifty foot (50') wide right-of-way for an electric transmission pole line (Appendix, figure 2).

3.2 Special Characteristics:

3.21 Climate (recording station at Glacier Park International Airport, Kalispell)

| | |
|---|---|
| Average Date of First Freeze | September 23 |
| Average Date of Last Freeze | May 12 |
| Average Date of Frost-free Season | 135 days |
| Average Annual Snowfall | 67.3 inches |
| Average Annual Total Precipitation | 15.4 inches |
| Mean Annual Temperature | 42.8° F. |
| Highest Temperature Recorded | 105° F. (August, 1961) |
| Lowest Temperature Recorded | -35° F. (December, 1968) |
| Annual Average Maximum Temperature | 55.1° F. |
| Annual Average Minimum Temperature | 30.6° F. |

3.22 Soils

Specific information on the alluvial soil types has been taken from the Soil Conservation Service's soil survey publication on the Upper Flathead Valley Area, Montana and Engineering Properties and Soil Interpretations For Use In Resource Planning and Development. The Chamokane series soil type is found on the Western portion of the area and consists of shallow, immature soils of the flood plains. Historically, these soils have been deposited by the Flathead River; however, the Stillwater River has added this soil type to the area in this case. These soils are subject to flooding in spring and early summer. Light-colored alluvium is deposited on them each year. The surface soil of the Chamokane soils is grayish brown sandy, and is

underlain by pale-brown sandy material. Light brownish-gray fine sandy material occurs at an average depth of about 2 feet. These soils are generally slightly calcareous throughout. The Banks series soils form the remainder of the area and are sandy for their entire depth. They occupy flood plains, mainly along the Flathead River. They have developed in recently deposited, very sandy alluvium.

Banks soils are subject to frequent flooding, but between floods they are well drained down to the water table. These soils have been weathered little since the parent material was deposited. Only a small amount of organic matter has accumulated in the surface soil. Vegetation has had little effect on color or other characteristics of these soils; all layers are calcareous (Appendix, Extract 1 and map 1).

### 3.23 Water

The Stillwater and Flathead Rivers are major features of the Natural Areas. The Montana Department of Health and Environmental Sciences office in Kalispell indicates that the water quality of the Stillwater River at this location is very good, although the oxygen content is less than optimum. The water quality of the Flathead River is excellent and unquestionably one of the purest streams in the United States. Water quality data for both of these rivers near the proposed Natural Area is limited at this time, but current water-related studies may provide more complete information in the near future. The results of water samples taken on the Stillwater River just north of the Natural Area are provided (Appendix, figure 3).

Floodplain information contained in the Corps of Engineers report on the Flathead, Stillwater and Whitefish Rivers indicates that the entire island lies within the intermediate regional flood zone. Studies have shown that the seasonal water table is from 3' - 10' from the ground surface, but is normally found from 2' - 6' depth (Appendix, map 2).

### 3.24 Wildlife and Fisheries

The Natural Area ecosystem includes a diverse assortment of resident and tran-

sient animals. A complete list of the mammals, birds, reptiles and other forms of animal life found on the Natural Area has yet to be compiled, but the following animal life has either been observed or is suspected of using the island during certain periods of the year:

| | |
|---|---|
| Whitetail Deer (winter and summer range) | Coyote |
| Racoon | Beaver |
| Muskrat | Mink |
| Weasel | Cottontail Rabbit |
| Red Squirrel | Bald Eagle |
| Great Blue Herron | Osprey |
| Canada Geese | Wild Turkey |
| Ducks (numerous species) | Ring-necked Pheasant |
| Ruffled Grouse | Songbirds (numerous species) |
| Reptiles | Amphibians |

Fish species found in the river systems include:

| | |
|---|---|
| Dolly Varden | Lake Whitefish |
| Rainbow (small population) | Kokanee Salmon |
| Mountain Whitefish | |

The wildlife and fish species presently found attest to the excellent quality habitat provided by the island and its adjacent water resources.

Of special interest is the Great Blue Herron and its past history in the immediate vicinity of the area. South of the island a herron rookery consisting of 160 nests existed until 1968 when the forest was clear cut, forcing the birds to relocate. Also, several species of migratory waterfowl are found on the rivers bordering the island and migratory fish use both rivers as passageways to their spawning grounds.

3.25 Vegetation

About 90% of the island is densely wooded, predominately with majestic black cottonwood measuring up to 4½' DBH (diameter breast height). Spruce is also found

throughout the island as is River Birch, scattered Douglas Fir and occasional Ponderosa Pines. The undergrowth is thick and nearly impenetrable in places due to the abundance of alder, hawthorne, chokecherry, rose and other shrub species; however, the vegetation density varies from open spaces to very dense areas (Appendix, map 3).

A complete species list has not been completed at this time, but preliminary observations indicate that the island's vegetative cover is of the Picea/Equisetum Arvense habitat type (Spruce/common horsetail) as described in the Forest Habitat Types of Montana by Pfister (Appendix, Extract 3). Those species of trees, shrubs, grasses and forbs that have been identified include the following:

| | | |
|---|---|---|
| Trees: | Black Cottonwood | Englemann Spruce (possibly a hybrid with White Spruce) |
| | River Birch | |
| | Douglas Fir | Ponderosa Pine |
| Shrubs: | Willow | Ribes |
| | Snowberry | Buffalo Berry |
| | Alder | Hawthorne |
| | Thimbleberry | Rose |
| | Dogwood | Chokecherry |
| Grasses and Forbs: | Solomon-plum | False Solomon's Seal |
| | Wake-robin | Twisted Stalk |
| | Veratrum | Fireweed |
| | Pyrola | Ricegrass |
| | Wild Rye | Wild Sarsaparilla |
| | Nettle | Horsetail |
| | Asparagus | Strawberry |

These species suggest that the forest cover type, as categorized by the Society of American Foresters in Forest Cover Types of North America, is "Black Cottonwood - Willow" (Type 222).

3.26 Geology

Bedrock geology of the area around Kalispell consists of carbonates and argillites of the Precambrian Belt series. During the Quaternary Wisconsin age, ice sheets advancing south from British Columbia covered the land to at least 2,000 feet and left glacial stratified and non-stratified deposits over much of Northwestern Montana. Kalispell itself is built on the western edge of an extensive plain of undifferentiated glacial drift and lacustrine silt and drift which extends eastward for about fifteen miles. Overlying this material in its central part is thin alluvium deposited on the flood plain of the Flathead River. This alluvial sand and gravel comprises the natural area (Appendix, map 4).

3.27 Human Use

Prior to the 19th Century the Flathead River Valley was inhabited solely by various Indian tribes, and the river system, in conjunction with the adjacent lands, was used as a travel corridor. Fur trading became an important use of the Flathead and Stillwater Rivers in the early 1800's with the establishment of the Northwest Fur and Hudson Companies in the valley. In 1887, the future townsite of Demersville had its beginning on the West bank of the Flathead River about 2 miles south of the proposed Natural Area. By 1891, the town's population had grown to more than 1,000 due largely to the steamboat traffic moving upstream from Flathead Lake, but with the development of the Great Northern Railway through Kalispell, the rapid demise of Demersville took place.

In more recent times the Flathead and Stillwater Rivers, as well as the Natural Area itself, have been used by recreationists. Recreation surveys indicate that demand for water related activities will increase in the future. However, no figures on visitor use are available at this time.

3.28 Pre-existing Uses

All provisions of this plan are subject to the existing rights previously granted

by State Patents, Right-of-Way Deeds, Leases and Licenses. Specific conveyances of record which take precedence over the restrictions of this plan include State Forest Land Use Authorization No. L-0373 and Right-of-Way Deed No. D-4074. However, it is a provision of this plan that all previously granted rights which are less than fee-simple, shall revert to and become the subject of all the respective requirements of this plan, upon their expiration.

4. Management Practices

4.1 General Management

The enclosed management map (Appendix, map 6) denotes access, management, boundaries and other pertinent requirements of this section. The following practices apply to the entire Natural Area.

4.11 Permits

The Managing Entity shall issue permits, free of charge, for the collecting of research or study specimens when this activity is to be conducted on a continuing basis; for the installation of environmental monitoring devices that are necessary for research; and for group uses of the area when repeated visits are planned. The purpose of these permits shall be to establish a record of the benefits which are being realized from the area, and to monitor the uses on the area. The Managing Entity shall disallow all permit applications which include a proposed activity that would cause undue harm to the Natural Area. In addition, the Department may initiate, modify, suspend or revoke any and all permits. All permits shall include a statement which notifies the permittee that he enters the area at his own risk.

4.12 Records

Recorded visits, field inspections, permits, nature studies and other materials valuable for guiding the prudent management of the area should be maintained in a retrievable fashion by the Managing Entity, for future reference.

4.13 Wildlife and Fisheries Management

The taking of fish and wildlife shall continue in accordance with those regulations promulgated by the Montana Department of Fish and Game.

4.14 Regulation of Diseases and Insects

The control of diseases affecting vegetation and wildlife, and the control of insects, will be left to natural biological forces. Application of chemical controls may be initiated only when evidence clearly establishes that the Natural Area is the source of a disease or insect infestation which constitutes a human health hazard to adjacent populations, and the Department has approved the use of these controls.

4.15 Scenic and Landscape Management

No effort shall be made to shape the area's features for man's aesthetic pleasure. Trees or shrubs may be cut only in accordance with Sections 4.21d and 4.23e. No scenic vistas shall be created. No exotic plant species shall be introduced upon the area. Horticultural practices are not permitted, and no species shall be fertilized or cultivated.

4.16 Vegetation Management

The native species of trees, shrubs, grasses and all other vegetation shall not be harvested, or taken from the area except as is provided for in Section 4.11; nor shall these features be utilized on the area for the mere luxury of personal comfort. The gathering of firewood is prohibited. Exotic species and noxious weeds (as defined by law) may be removed by physical or mechanical means, as the Managing Entity may determine necessary for controlling the propagation of these species. Chemical herbicides may be applied with the Department's approval only when it can be documented that the natural integrity of the area is being compromised by the exotic vegetation, and no other means will remove this threat. No threatened, rare, or endangered plant species are currently known to exist on the area, but the removal of such species, should they be later identified or presently known species become so classified,

may only be undertaken with the express written permission of the Department.

The restoration of those sites which have experienced a significant amount of prior man caused disturbance, whether within the present Natural Area boundaries or in subsequent additions to this area, may be reclaimed by those land management techniques which the Managing Entity determines appropriate--provided that natural regeneration will not restore the area within a reasonable period of time.

The right to remove and trim vegetation within and adjacent to the existing Right-of-Way Deed No. D-4074 will remain in effect.

4.17 Erosion Control

Erosion Control will be allowed when required to protect the existing Right-of-Way Deed No. D-4074. In all other cases soil erosion will be allowed to occur naturally, and the rivers shall be allowed to seek their own courses.

4.18 Boundary Markers and Fences

The Managing Entity may post the boundaries of the Natural Area with appropriate markers, to facilitate management of the area. Fences may be constructed along the boundary of the area to limit domestic livestock, provided that they do not unnecessarily restrict the movement of wildlife or compromise suitable points of public access. However, the lack of such boundary protection devices shall not restrict the State from seeking to remedy trespass of the area, or to prevent other activities which damage the area.

4.19 Predator Control

Native wildlife species commonly regarded as predators shall not be controlled on the area, unless their populations exceed levels which will be controlled through the course of natural selection. The Managing Entity may introduce such measures as are necessary for controlling excessive predator populations, provided that chemical pesticides or poisons are not utilized. In all cases, predator control efforts shall be tailored in such a manner that other wildlife species and the public are not likely to be harmed.

4.110 Commercial Enterprises

No concessions, business ventures, soliciting or other practices which could be considered a commercial enterprise may be conducted on the area, or allowed to be conducted by the Managing Entity.

4.111 Recreation

In keeping with the basic theme prompting the preservation of all Natural Areas, the recreational use of the area must be passive in nature. All mechanical modes of transportation used to arrive at the area shall be left outside the Area. Motor cycles, snowmobiles, bicycles, all-terrain vehicles and other similar conveyances shall not be used to traverse the area. The Managing Entity may invoke further restrictions on the recreational use of the area as it seems necessary for preserving the Natural Area. Included in this discretion is the authorization to close portions of the Natural Area to public use, to allow only seasonal use of over-used or fragile areas, or to rest areas of popular use by rotating the seasons or years which they may be utilized.

4.112 Public Safety

In recognition of the location of the Natural Area, adjacent to and between two navigable rivers, the Managing Entity shall not encourage the use of the area during periods of high water flow. The Managing Entity may also discourage use of the area in the interest of public safety, by closing access and by deferring the approval of group use or study permits. The public media may be utilized as a means to discourage seasonal use of the area when a potential safety hazard exists. The Managing Entity should also make every practical effort to identify and warn the public of potential safety hazards and may restrict access to specific areas when a hazard warrants this action.

4.113 Water Diversion

No devices shall be constructed or introduced on the area to divert, impound or develop water for irrigation or any other purpose.

4.114 Mining Operations

No mineral or non-metalliferous materials may be removed from any portion of the Natural Area, by any means.

4.115 Exotic Species

No exotic species of flora or fauna may be introduced or released upon the area.

4.116 Right-of-Way

The general public may enjoy the right of Ingress and Egress, as the provisions of this plan describe--provided, however, that all visitors accept as a condition of this right that they enter upon the area at their own risk. No other right-of-ways, with the exception of those presently existing and described in Sections 3.28 and 4.22a, shall be granted by any device.

4.117 Powerline Maintenance

The general maintenance of the powerline described in Right-of-Way Deed No. D-4074 (Section 3.28) may continue to the extent that the Natural Area does not experience undue damage. Brush and trees may be removed from the existing right-of-way through the use of power tools, but no chemical defoliants may be utilized. Motorized equipment and vehicles may enter the Natural Area only when their use is necessary to maintain the powerline. The capacity of the transmission line cannot be increased through an expansion of the existing fifty (50) foot wide right-of-way. Prior to entering the Natural Area for the purpose of maintaining the transmission line, the Natural Area manager must be notified and be informed of the intended maintenance activities unless an emergency situation exists and immediate access is required to help remedy the situation.

4.2 Specific Management

The major objective for the management of the Natural Area shall be to maintain the island's character much as it presently exists. The guiding principle for resolving future management conflicts, which are not addressed herein, shall be in favor of preserving the longevity and viability of the area's natural features.

4.21 Access To Island

The only form of access presently available to the island is via boat or by swimming. Boats may be beached at any point along the island's shores for the purposes of access. No bridges, permanent ferry boats or cable cars may be constructed for access to the area. Access shall remain by present means until such time as studies of the use tolerance of the area's soils and vegetation has established the allowable visitor carrying capacity. The Master Plan may then be amended to reflect the appropriate means of access which may be established.

4.22 Vehicles and Motor Powered Equipment

No motor driven transport vehicles of any design or any type motor powered equipment are allowed on the area except when necessary to maintain Right-of-Way Deed No. D-4074.

4.23 Recreation

Recreational activities are limited to nature studies; outdoor photography; fishing; hunting; hiking; the observation of native wildlife and vegetation and other casual uses of the area. Float-in visitors may make use of the area, but camping and camp fires are prohibited. Shelters constructed of natural or synthetic materials shall not be erected on the area.

4.24 Interpretive Guides

The Managing Entity may provide printed nature guides concerning the natural features of the area, and post identifying or descriptive markers near features of natural interest, provided that the interpreted features are not rare, threatened, endangered or particularly sensitive to attention.

4.25 Fire Suppression

Fires will be controlled by conventional means when private property or public safety is threatened. The Management Entity shall make every reasonable effort to contain fires within the boundaries of the Natural Area.

4.26 Structures

No facilities or structures shall be placed in this Natural Area except as is provided for in section 4.11 and for necessary maintenance of Right-of-Way Deed No. D-4074.

4.27 Management of Rivers

The rivers comprising this area provide a natural barrier for the protection of the island preserve. Their waters also provide a recreational resource for the public, and sustain the aquatic life of the Natural Area. Though the maintenance of the rivers' water quality and natural flow cannot be assured through the preservation of this Natural Area, the value of these attributes is recognized as a prerequisite for the long-term viability of the area. The preservation and maintenance of the rivers as they flow through the Natural Area will be governed as this section provides.

4.27a Navigation

All forms of navigation, for recreational or commercial purposes, will not be impaired. The use of the waterways as a travel route shall continue unrestricted. No fences or other obstructions shall be placed across or in the rivers, except as is provided for in the following section.

4.27b Facilities and Structures

No boat docks or ramps, jetties, dikes, or diversions may be placed in or on the shores of the rivers. No effluent or other debris may be discharged into the rivers. Dredging, excavation, or filling, for any purpose, is not allowed within this zone. Stream gauging devices may be placed within the area, upon the grant of a permit (Section 4.11) by the Managing Entity.

4.28 Access Lanes

Legal public access to the West boundary of Natural Area exists at two points. Treasure Lane, a thirty (30) foot wide public roadway, is the Northern most point of access. Green Ridge Drive is a sixty (60) foot wide public roadway located one-quarter (¼) of a mile South of Treasure Lane. These access lanes are noted on the

Management Map.

4.29 Signs

The Managing Entity may post the access points with appropriate markers and information describing the permitted uses of the Natural Area. The Managing Entity shall determine the most desirable point of principal access to this zone and erect a suitable sign denoting the designation of the area as "Owen Sowerwine Natural Area". This marker shall also include the name of the Natural Area's principal manager, and include a telephone number where this individual may be reached for information regarding the Natural Area. Other beneficial information such as a map of the area and waterways should be included at this entrance. This sign shall also include a notice which clearly states that visitors to the area enter at their own risk.

5. Supplemental Management Responsibilities

The Managing Entity should make all practical effort to monitor the influences shaping the character of the Natural Area. Specific attention should be given to man-caused disturbances of either the Flathead or Stillwater Rivers, as a significant change in the pattern of flow of these rivers could become a direct threat to the Natural Area. Should the Managing Entity discover a development occurring within these rivers, which threatened the Natural Area, the Department should be notified immediately.

## LITERATURE CITED

Cordell, Grayson V. Jr., 1971. Climate of Montana. U.S. Department of Commerce, National Oceanic and Atmospheric Administration Environmental Data Service, Silver Springs, Maryland, Circular 21pp.

Johns, Willis M., 1970. Geology and Mineral Deposits of Lincoln and Flathead Counties, Montana. Montana Bureau of Mines and Geology, Butte, Montana, Bulletin 79, 155pp. and maps.

Pfister, Robert D., Bernard L. Kovalchik, Stephen F. Arno, and Richard C. Presby, 1974. Forest Habitat Types of Montana. U.S.D.A. Forest Service Int. Forest and Range Experiment Station -- Northern Region. 231pp.

Society of American Foresters, 1975. Forest Cover Types of North America. Society of American Foresters, Bethesda, Maryland. 67pp.

Soil Conservation Service, with Montana Agricultural Experiment Station, 1960. Soil Survey of Upper Flathead Valley Area Montana. U.S. Department of Agriculture. Washington, D. C. 67pp. and maps.

# APPENDIX

FIGURE 1 DUPLICATE

STATE OF MONTANA — OFFICE OF THE STATE FORESTER

State Forest Land Use Authorization

No. L-0373

This agreement made and entered into this 1st day of March 19 69,

by and between the State of Montana, hereinafter called licensor, and Milo J. Howard,

hereinafter called licensee, witnesseth:

In consideration of the mutual covenants hereinafter stated, the parties hereto agree as follows:

The licensor hereby grants to the licensee a license to occupy and use, subject to all of the terms and conditions hereinafter stated, the following described premises

E½SE¼, excepting therefrom 12½ acres described as S½NW¼NE¼SW¼, N½W¼NE¼SW¼, W½SW¼NE¼SW¼,

Section 16, Township 28 North, Range 21 West

The premises will be used by the licensee solely for the purpose of grazing and agricultural use of 1½ acres

and for incidental purposes related thereto for a term beginning March 1, 19 69, and ending

February 28, 19 79, or until this agreement is terminated as hereinafter provided.

In consideration of the issuance of this agreement the licensee shall pay annually the licensor Two Hundred Fifty Six

and no/100 ---------- dollars ($ 256.00 ) for the period from the execution of this agreement to and including the 28th of February of the next succeeding year. It is further agreed that the rental rate for the remainder of the term covered by this agreement shall be that rate established by the State Board of Land Commissioners. Any revision of said rate by the State Board of Land Commissioners shall be applicable to this permit for the next succeeding year following such revision. The first payment shall be made on the date of execution of this agreement. Subsequent payments under this agreement shall be payable annually and in advance. Such payments shall be due and payable on the 15th day of December. In the event that any payment due under this agreement is not paid on or before the date required by this agreement, this agreement is automatically terminated.

In the event that this license is issued for the purpose of livestock grazing, the licensee agrees that only 8 head of cattle or equivalent will be grazed on these premises ~~for~~ from June 15 - Oct. 15 - 4 months, or 32 Animal-Unit-Months for a period of ten years from date hereof. **The State reserves the right to raise or lower the above carrying capacity when grazing surveys indicate such a change is warranted.**

The licensee shall pay the grazing fee as set by the Commissioner of State Lands and Investments each year provided that no lease issued as a result of competitive bidding shall be subject to this provision, unless the rental set by competitive bidding is less than the authorized minimum rental.

As further consideration for this agreement the licensee specifically agrees to:

1. Comply with all regulations governing the use of State Forest Land including all State Sanitary Laws and Regulations applicable to these premises.

2. Take all reasonable precautions to prevent and suppress forest fires.

3. Report immediately to the State Forester any trespassing livestock or timber cutting observed upon these premises.

4. Refrain from cutting or destroying any State Forest Timber or using any of said timber for the construction of improvements unless written permission has first been obtained from the State Forester.

5. Refrain from using any State Property without first obtaining the permission of the State Forester.

6 Peaceably yield possession of these premises upon termination of this license for any cause.

The licensor, as further consideration for this agreement, agrees to:

7. Allow the licensee to construct improvements which will increase the use for which this license was granted; however, the licensee must file plans and specifications for such improvements with and obtain the approval of the State Forester prior to the actual construction of such improvements.

8. Allow the licensee to remove all improvements constructed by him on these premises upon the termination of the agreement, provided that the licensee removes such improvements within sixty days after the termination of the agreement and that such removal will not damage the premises. Upon the failure to remove said improvements within the specified sixty day period, all right, title and interest in such improvements will become vested in the licensor. The licensee shall not remove such improvements without first obtaining the permission of the State Forester and permission will not be granted as long as licensee has failed to make payment of any money due the licensor under any of the terms of this agreement.

9. Allow this license to be transferred by the licensee to any other person after proper application has been made to and the written approval secured from the State Forester. Any attempt to transfer this license without the State Forester's written approval will result in the automatic termination of this agreement.

It is further agreed that:

10. The State Forester has the power to cancel this license for any of the following causes: misrepresentation, fraud, or concealment of facts relating to the issuance of this license where such facts if known would have prevented the issuance of this license; use of the premises for purposes other than those herein authorized; overgrazing or any other misuse or abuse of the premises; or for any other reason which in the judgment of the State Forester is necessary for the protection of the best interests of the licensor. Cancellation of this license for reasons stated in this section will not entitle the licensee to any refund of or exemption in the payment of license fee stated in this agreement.

11. The licensor reserves the right to withdraw all or any part of these premises from grazing if in the opinion of the State Forester the premises are overgrazed and such withdrawal will be in the best interests of the licensor. In the event of such withdrawal grazing fees will be adjusted on the basis of the adjusted carrying capacity of the premises

12. The licensee shall permit State Forest Officials, Users of State Forest Lands, Purchasers of State Forest Products, free ingress and egress across the premises herein described, when so authorized by the State Forester. The licensor reserves the right to enter upon these premises to prospect for coal, oil, gas and minerals, and to grant permits for other uses not in conflict with this permit.

13. Where this license is granted for the purpose of grazing livestock the licensee agrees that all bedding and salting of livestock shall be at a distance of ¼ mile from streams, lakeshores, and other water, or on divides between drainages when streams are closer together than ½ mile.

14. The licensee agrees not to use lands under this agreement for the purpose of encroaching on adjacent range lands or in such a manner as to cause overgrazing or soil and range deterioration on adjacent lands.

15. This authorization is subject to cabinsite rules and regulations as approved by the State Board of Land Commissioners. See Attachment.

16. The licensee is required to pay any costs of noxious weed control in the event any portion of the area described in the license is included in a "County Weed Control District project.

16a. The licensee may be required to construct and maintain fences as directed by the State Forester to promote better range management and prevent unauthorized use of the above described area by trespass stock.

17. The making, execution and delivery of this agreement by the licensee has been induced by no representations, statements, warranties, or agreements other than those herein expressed This agreement embodies the entire understanding of the parties and there are no further or other agreements or understandings, written or oral, in effect between the parties, relating to the subject matter hereof except as maybe hereto attached This instrument may be amended or modified only by an instrument of equal formality signed by the respective parties

IN WITNESS WHEREOF.

LICENSOR

David C. Moon
State Forester

By Earl L. Lorenz
Forest Management Supervisor

LICENSEE

Address Route 2, Kalispell, Montana 59901

(This Form approved by State Board of Land Co[illegible] February 8, 1961)

RIGHT OF WAY APPLICATION NO. 4771
AFFECTING THE E½NW¼, Sec. 16, Twp. 28N.,
Rge. 21W., Flathead County, Montana.

Form R 48—1M—7-54

No. D-4074

# RIGHT OF WAY DEED

**IN THE NAME AND BY THE AUTHORITY OF THE STATE OF MONTANA**

29

To All To Whom These Presents Shall Come:

Know ye that the State of Montana, in consideration of the sum of ----------

----------EIGHTEEN AND 40/100---------- Dollars

now paid, grants to ----------PACIFIC POWER AND LIGHT COMPANY----------
---Kalispell, Montana---

a right of way for a ----------ELECTRIC TRANSMISSION POLE LINE----------

---

---

upon and across state lands, as follows:

A tract or strip of land in the E½NW¼, Section 16, Township 28 North, Range 21 West, Montana Principal Meridian, Flathead County, Montana, more particularly described as follows:

A tract or strip of land 50 feet wide, 25 feet on each side of the following described center line; Beginning at a point on the west boundary line of the E½NW¼, of Section 16, Township 28 North, Range 21 West which is South 1476.5 feet from the northwest corner of said E½NW¼; thence North 23° 59' East a distance of 1698.6 feet to a point on the north boundary line which is East 626.2 feet from the northwest corner of said E½NW¼ of Section 16, and containing in all 1.84 acres, more or less.

FIGURE 2

This right of way is granted upon the express condition, which is accepted by the grantee, that the State and its lessees and purchasers shall have the right to use and fully enjoy the land hereby granted, except the part that is actually occupied by the poles and supports, to cultivate, seed and harvest the crops thereon; and that the grantee and its successors and assigns shall pay any and all damages which may result to the crops, fences and other property from the construction, maintenance, operation or removal of the said electric transmission pole line. The said damages if not mutually agreed upon shall be ascertained and determined by three disinterested persons, one of whom to be appointed by the purchaser or lessee of the land, heirs or assigns, one by the grantee herein, its successors or assigns, and the third by the two so appointed as aforesaid The award of such three persons shall be final and conclusive.

It is also understood and agreed by and between the parties hereto that if any conflict should arise, this easement shall be inferior and subject to any easement heretofore or hereafter granted in the said lands for public highways.

**It is further Provided that whenever said lands herein granted as a right of way shall cease to be used for such purpose, the same shall revert to the state upon notice to that effect being given to the said grantee named herein.**

**IN TESTIMONY WHEREOF, the State of Montana has caused these presents to be executed by the Governor, and to be attested by the Secretary of State, and countersigned by the Commissioner of State Lands and Investments, and the Great Seal of the State, and the Seal of the State Board of Land Commissioners to be hereunto affixed this THIRD day of SEPTEMBER A. D. 1958.**

/s/ J. Hugo Aronson
Governor of the State of Montana

ATTEST:

/s/ Frank Murray
Secretary of State

Countersigned by

/s/ Lou E. Bretzke
Commissioner of State Lands and Investments

GREAT SEAL OF MONTANA

SEAL OF STATE BOARD OF LAND COMMISSIONERS

30

FIGURE 3

WATER QUALITY BUREAU-MONT STATE HEALTH DEPT. HELENA, MONTANA 59601

WATER QUALITY ANALYSIS

| | | | |
|---|---|---|---|
| STATE | MONTANA | COUNTY | FLATHEAD |
| LATITUDE-LONGITUDE | 481214N 1141652W | LOCATION | 28N 21W 09CAB |
| SAMPLE TYPE | STREAM | LAB NO. | 72- 106 |
| GEOLOGICAL SOURCE | | SAMPLE OR BOTTLE NO. | 721016 |
| DRAINAGE BASIN | | AGENCY AND STATION CODE | KWQ -04 |
| DATE SAMPLED | 10-16-72 | DEPTH WATER ENTERS WELL | |
| TIME SAMPLED | 0900 | SWL ABOVE(+) OR BELOW GS | |
| DATE ANALYZED | 12-12-72 | ALTITUDE OF SAMPLE POINT | 2890 |
| SAMPLE HANDLING | 1210 | WATER FLOW RATE | |
| METHOD SAMPLED | BOTTLE | FLOW MEAS METHOD | |
| SANITARY CONDITION | | PRINCIPAL USE OF WATER | MULTIPLE |

PROJECT KALISPELL WATER QUALITY BUREAU,KEENAN, K.D.
REMARKS STILLWATER R. AT KALISPELL

PARAMETERS REPORTED IN MILLIGRAMS PER LITER EXCEPT AS INDICATED

| | MG/L | MEQ/L | | MG/L | MEQ/L |
|---|---|---|---|---|---|
| CALCIUM (CA) | 37. | 1.860 | BICARBONATE (HCO3) | 167. | 2.739 |
| MAGNESIUM (MG) | 12.1 | 0.998 | CARBONATE (CO3) | 0. | 0.000 |
| SODIUM (NA) | 2.6 | 0.113 | HYDROXIDE (OH) | 0. | 0.000 |
| POTASSIUM (K) | | | CHLORIDE (CL) | 0.7 | 0.018 |
| TOT. IRON (FE) | .07 | 0.004 | SULFATE (SO4) | 4.5 | 0.094 |
| MANGANESE (MN) | | | NITRATE (NO3) | | |
| ALUMINUM (AL) | | | FLUORIDE (F) | | |
| SILICA (SIO2) | | | PHOSPHATE (PO4) | | |
| TOTAL CATIONS | 2.974 | | TOTAL ANIONS | | 2.851 |

STANDARD DEVIATION OF CATION-ANION BALANCE -0.81 SIGMA

| | | | |
|---|---|---|---|
| LABORATORY PH | 8.00 | CARBONATE HARDNESS AS CACO3 | 137 |
| FIELD TEMPERATURE | | NON-CARB. HARDNESS AS CACO3 | 5 |
| CALCULATED DISSOLVED SOLIDS | 224.4 | TOTAL HARDNESS AS CACO3 | 142 |
| EVAPORATED SOLIDS AT 105 C | | TOTAL ALKALINITY AS CACO3 | 137 |
| SPECIFIC CONDUCTANCE IN MICROMHOS/CM AT 25 C | 257.0 | LANGLIER SATURATION INDEX | |
| | | RYSNAR STABILITY INDEX | |
| SODIUM ADSORPTION RATIO | 0.1 | TECH. CORROSION INDEX | |

ADDITIONAL PARAMETERS

| | | | |
|---|---|---|---|
| AA CALCIUM (CA) | 42. | AA MAGNESIUM (MG) | 10. |
| TR LEAD (PB) | .03 | TR ZINC (ZN) | .01 |
| TR COPPER (CU) | .01 | TR CADMIUM (CD) | <.01 |
| TR MERCURY (HG) | <.001 | TR ARSENIC (AS) | .001 |

NO. PARAMETERS ARE TOTAL DISSOLVED UNLESS LABELED TR-TOTAL RECOVERABLE

| DILUTE SPECIFIC CONDUCTANCE | | | | PERCENT REACTANCE VALUES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAS DSC | 0. | CALC DSC | 277. | CA | MG | NA | K | CL | SO4 | HCO3 | CO3 | NO3 |
| CALCULATED MEQ/L | 0.0 | | | 65 | 34 | 4 | 0 | 1 | 3 | 96 | 0 | 0 |

ANALYST KEV PROCESSING PROGRAM 72(REV3)

NOTE. IN CORRESPONDENCE RELATED TO YSIS REFER TO NUMBER 72- 106

July - Supplement

WATER QUALITY BUREAU-MONT STATE HEALTH DEPT. HELENA, MONTANA 59601

WATER QUALITY ANALYSIS

| | | | |
|---|---|---|---|
| STATE | MONTANA | COUNTY | FLATHEAD |
| LATITUDE-LONGITUDE | 481214N 1141652W | LOCATION | 28N 21W 09CAB |
| SAMPLE TYPE | STREAM | LAB NO. | 73 1208 |
| GEOLOGICAL SOURCE | | SAMPLE OR BOTTLE NO. | 730723 |
| DRAINAGE BASIN | 76LJ | AGENCY AND STATION CODE | KWQ -04 |
| DATE SAMPLED | 07-23-73 | DEPTH WATER ENTERS WELL | |
| TIME SAMPLED | 1635 | SWL ABOVE(+) OR BELOW GS | |
| DATE ANALYZED | 07-27-73 | ALTITUDE OF SAMPLE POINT | 2890 |
| SAMPLE HANDLING | 4100 | WATER FLOW RATE | |
| METHOD SAMPLED | BOTTLE | FLOW MEAS METHOD | |
| SANITARY CONDITION | | PRINCIPAL USE OF WATER | MULTIPLE |

PROJECT KALISPELL WATER QUALITY BUREAU, KEENAN
REMARKS STILLWATER R. AT KALISPELL

PARAMETERS REPORTED IN MILLIGRAMS PER LITER EXCEPT AS INDICATED

| | MG/L | MEQ/L | | MG/L | MEQ/L |
|---|---|---|---|---|---|
| CALCIUM (CA) | | | BICARBONATE (HCO3) | 150. | 2.457 |
| MAGNESIUM (MG) | | | CARBONATE (CO3) | 0. | 0.0 |
| SODIUM (NA) | | | HYDROXIDE (OH) | 0. | 0.000 |
| POTASSIUM (K) | | | CHLORIDE (CL) | | |
| TOT. IRON (FE) | | | SULFATE (SO4) | | |
| MANGANESE (MN) | | | NITRATE (NO3) | .22 | 0.004 |
| ALUMINUM (AL) | | | FLUORIDE (F) | | |
| SILICA (SIO2) | | | PHOSPHATE (PO4) | | |
| TOTAL CATIONS | | 0.0 | TOTAL ANIONS | | 2.461 |

STANDARD DEVIATION OF CATION-ANION BALANCE 9.99 SIGMA

| | | | |
|---|---|---|---|
| LABORATORY PH | 8.30 | CARBONATE HARDNESS AS CACO3 | 0 |
| FIELD TEMPERATURE | | NON-CARB. HARDNESS AS CACO3 | 0 |
| CALCULATED DISSOLVED SOLIDS | 150.2 | TOTAL HARDNESS AS CACO3 | 0 |
| EVAPORATED SOLIDS AT 105 C | | TOTAL ALKALINITY AS CACO3 | 123 |
| SPECIFIC CONDUCTANCE IN MICROMHOS/CM AT 25 C | 233.0 | LANGLIER SATURATION INDEX | |
| | | RYSNAR STABILITY INDEX | |
| SODIUM ADSORPTION RATIO | 0.0 | TECH. CORROSION INDEX | |

ADDITIONAL PARAMETERS

| | | | |
|---|---|---|---|
| LAB.TURBIDITY (JTU) | 2.50 | TOTAL PHOSPHATE(PO4) | .07 |
| NITRITE TOTAL AS N | <.03 | | |

NOTE. PARAMETERS ARE TOTAL DISSOLVED UNLESS LABELED TR-TOTAL RECOVERABLE

DILUTE SPECIFIC CONDUCTANCE PERCENT REACTANCE VALUES

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S DSC | 0. | CALC DSC | 107. | CA | MG | NA | K | CL | SO4 | HCO3 | CO3 NO3 |
| CALCULATED MEQ/L | 0.0 | | | 0 | 0 | 0 | 0 | 0 | 0.100 | .0 | 0 |

ANALYST KDK PROCESSING PROGRAM 72(REV3)

NOTE. IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 73 1208

WATER QUALITY BUREAU-MONT STATE HEALTH DEPT. HELENA, MONTANA 59601

WATER QUALITY ANALYSIS

| | | | |
|---|---|---|---|
| STATE | MONTANA | COUNTY | FLATHEAD |
| LATITUDE-LONGITUDE | 481214N 1141652W | LOCATION | 28N 21W 09CAB |
| SAMPLE TYPE | STREAM | LAB NO. | 73 1056 |
| GEOLOGICAL SOURCE | | SAMPLE OR BOTTLE NO. | 730723 |
| DRAINAGE BASIN | | AGENCY AND STATION CODE | KWQ -04 |
| DATE SAMPLED | 07-23-73 | DEPTH WATER ENTERS WELL | |
| TIME SAMPLED | 1635 | SWL ABOVE(+) OR BELOW GS | |
| DATE ANALYZED | 08-21-73 | ALTITUDE OF SAMPLE POINT | 2890 |
| SAMPLE HANDLING | 1100 | WATER FLOW RATE | |
| METHOD SAMPLED | BOTTLE | FLOW MEAS METHOD | |
| SANITARY CONDITION | | PRINCIPAL USE OF WATER | MULTIPLE |

PROJECT KALISPELL WATER QUALITY BUREAU, KEENAN
REMARKS STILLWATER R. AT KALISPELL

PARAMETERS REPORTED IN MILLIGRAMS PER LITER EXCEPT AS INDICATED

| | MG/L | MEQ/L | | MG/L | MEQ/L |
|---|---|---|---|---|---|
| CALCIUM (CA) | 32. | 1.597 | BICARBONATE (HCO3) | 138. | 2.269 |
| MAGNESIUM (MG) | 8.0 | 0.658 | CARBONATE (CO3) | 0. | 0.000 |
| SODIUM (NA) | 2.3 | 0.100 | HYDROXIDE (OH) | 0. | 0.000 |
| POTASSIUM (K) | | | CHLORIDE (CL) | 0.7 | 0.021 |
| TOT. IRON (FE) | | | SULFATE (SO4) | 6.8 | 0.142 |
| MANGANESE (MN) | | | NITRATE (NO3) | | |
| ALUMINUM (AL) | | | FLUORIDE (F) | | |
| SILICA (SIO2) | | | PHOSPHATE (PO4) | | |
| TOTAL CATIONS | | 2.355 | TOTAL ANIONS | | 2.432 |

STANDARD DEVIATION OF CATION-ANION BALANCE 0.54 SIGMA

| | | | |
|---|---|---|---|
| LABORATORY PH | 8.30 | CARBONATE HARDNESS AS CACO3 | 113 |
| FIELD TEMPERATURE | | NON-CARB. HARDNESS AS CACO3 | 0 |
| CALCULATED DISSOLVED SOLIDS | 188.3 | TOTAL HARDNESS AS CACO3 | 113 |
| EVAPORATED SOLIDS AT 105 C | | TOTAL ALKALINITY AS CACO3 | 114 |
| SPECIFIC CONDUCTANCE IN MICROMHOS/CM AT 25 C | | LANGLIER SATURATION INDEX | |
| | | RYSNAR STABILITY INDEX | |
| SODIUM ADSORPTION RATIO | 0.1 | TECH. CORROSION INDEX | |

ADDITIONAL PARAMETERS

| | | | |
|---|---|---|---|
| AA CALCIUM (CA) | 32. | AA MAGNESIUM (MG) | 8.0 |

NOTE. PARAMETERS ARE TOTAL DISSOLVED UNLESS LABELED TR-TOTAL RECOVERABLE

DILUTE SPECIFIC CONDUCTANCE

S DSC 0. CALC DSC 230.
ERROR DSC 0.0

PERCENT REACTANCE VALUES

| CA | MG | NA | K | CL | SO4 | HCO3 | CO3 | NO3 |
|---|---|---|---|---|---|---|---|---|
| 68 | 28 | 4 | 0 | 1 | 6 | 93 | 0 | 0 |

ANALYST KK PROCESSING PROGRAM 72(REV3)

NOTE. IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 73 1056

November - Supplement

WATER QUALITY BUREAU-MONT STATE HEALTH DEPT. HELENA, MONTANA 59601

WATER QUALITY ANALYSIS

| | | | |
|---|---|---|---|
| STATE | MONTANA | COUNTY | FLATHEAD |
| LATITUDE-LONGITUDE | 481214N 1141652W | LOCATION | 28N 21W 09CAB |
| SAMPLE TYPE | STREAM | LAB NO. | 73 2205 |
| GEOLOGICAL SOURCE | | SAMPLE OR BOTTLE NO. | 731108 |
| DRAINAGE BASIN | 76LJ | AGENCY AND STATION CODE | KWQ -04 |
| DATE SAMPLED | 11-08-73 | DEPTH WATER ENTERS WELL | |
| TIME SAMPLED | 1100 | SWL ABOVE(+) OR BELOW GS | |
| DATE ANALYZED | 11-20-73 | ALTITUDE OF SAMPLE POINT | 2890 |
| SAMPLE HANDLING | 7401 | WATER FLOW RATE | |
| METHOD SAMPLED | OTHER | FLOW MEAS METHOD | |
| SANITARY CONDITION | | PRINCIPAL USE OF WATER | MULTIPLE |

PROJECT KALISPELL WATER QUALITY BUREAU, KEENAN
REMARKS STILLWATER R. AT KALISPELL

PARAMETERS REPORTED IN MILLIGRAMS PER LITER EXCEPT AS INDICATED

| | MG/L | MEQ/L | | MG/L | MEQ/L |
|---|---|---|---|---|---|
| CALCIUM (CA) | | | BICARBONATE (HCO3) | 182. | 2.981 |
| MAGNESIUM (MG) | | | CARBONATE (CO3) | 2. | 0.060 |
| SODIUM (NA) | | | HYDROXIDE (OH) | 0. | 0.000 |
| POTASSIUM (K) | | | CHLORIDE (CL) | | |
| TOT. IRON (FE) | | | SULFATE (SO4) | | |
| MANGANESE (MN) | | | NITRATE (NO3) | .8 | 0.013 |
| ALUMINUM (AL) | | | FLUORIDE (F) | | |
| SILICA (SIO2) | | | PHOSPHATE (PO4) | | |
| TOTAL CATIONS | | 0.0 | TOTAL ANIONS | | 3.054 |

STANDARD DEVIATION OF CATION-ANION BALANCE 9.99 SIGMA

| | | | |
|---|---|---|---|
| LABORATORY PH | 8.35 | CARBONATE HARDNESS AS CACO3 | 0 |
| FIELD TEMPERATURE | 1.7 C | NON-CARB. HARDNESS AS CACO3 | 0 |
| CALCULATED DISSOLVED SOLIDS | 184.5 | TOTAL HARDNESS AS CACO3 | 0 |
| EVAPORATED SOLIDS AT 105 C | | TOTAL ALKALINITY AS CACO3 | 152 |
| SPECIFIC CONDUCTANCE IN MICROMHOS/CM AT 25 C | 280.0 | LANGLIER SATURATION INDEX | |
| | | RYSNAR STABILITY INDEX | |
| SODIUM ADSORPTION RATIO | 0.0 | TECH. CORROSION INDEX | |

ADDITIONAL PARAMETERS

| | | | |
|---|---|---|---|
| AIR TEMP. C | 2.5 | LAB.TURBIDITY (JTU) | 1.7 |
| RESIDUE TOT NFILT | 4. | DISSOLVED OXYGEN (O2) | 11.5 |
| BOD,5 DAYS (O2) | 2.8 | COD (O2) | 1.8 |
| F COLI MFM-FC/100ML | 10. | T COLI MFMENDO/100ML | 85. |
| TOTAL PHOSPHATE(PO4) | .04 | ORTHO PHOSPHATE(PO4) | .04 |

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ANALYTICAL RESULTS OFFICE

NOTE. PARAMETERS ARE TOTAL DISSOLVED UNLESS LABELED TR-TOTAL RECOVERABLE

DILUTE SPECIFIC CONDUCTANCE

| | | | |
|---|---|---|---|
| MS DSC | 0. | CALC DSC | 136. |
| ERROR DSC | 0.0 | | |

PERCENT REACTANCE VALUES

| CA | MG | NA | K | CL | SO4 | HCO3 | CO3 | NO3 |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 98 | 2 | 0 |

ANALYST KDK PROCESSING PROGRAM 72(REV3)

NOTE. IN CORRESPONDENCE RELATED TO THIS ANALYSIS REFER TO NUMBER 73 2205

SOILS ON SECTION 16, TOWNSHIP 28 NORTH, RANGE 21 WEST

FROM SOIL SURVEY SERIES 1946,
NO. 4, ISSUED SEPTEMBER 1960

UPPER FLATHEAD VALLEY AREA, MONTANA

U.S.D.A.
Soil Conservation Service
In cooperation with
Montana Agricultural Experiment Station

Map Symbol Cc:

Chamokane and Banks soils, 0 to 4 percent slopes (Cc). - This undifferentiated mapping unit consists of Chamokane soils and Banks loamy fine sand. These soils occur in such an intricate pattern that it was not feasible to map them separately. Both soils are described under their respective series.

The droughtiness of the Banks soils makes this unit generally unsuitable for farming. A small part is cultivated along with larger areas of more productive soils.

The mapping unit is mostly in brushy pasture, and it is in capability unit IVs-1.

Chamokane Series

The Chamokane series consists of shallow, immature soils of the flood plains. They occur mainly along the Flathead River. These soils are subject to flooding in spring and early in summer. Light-colored alluvium is deposited on them each year.

The native vegetation is a moderate to dense stand of deciduous trees and brush and scattered coniferous trees. The more open areas have a good cover of grass. Bluegrass and several kinds of clover readily establish themselves where the trees are thinned or cut.

The surface soil of the Chamokane soils is grayish brown and sandy. It is underlain by pale-brown sandy material. Light brownish-gray fine sandy material occurs at an average depth of about 2 feet. These soils are generally slightly calcareous throughout.

These soils are slightly darker and finer textured than the Banks soils.

Typical profile (Chamokane fine sandy loam):

$A_1$ 0 to 7 inches, grayish-brown to dark grayish-brown (10YR 5/2, dry; 4/2, moist) fine sandy loam; weak, medium, granular or crumb structure; soft when dry, very friable when moist; calcareous; boundary clear.

$C_1$ 7 to 12 inches, pale-brown to brown (10YR 6/3, dry; 4.5/3, moist) fine sandy loam; massive to weak, crumb structure; soft when dry, very friable when moist; calcareous; boundary clear.

$C_2$ 12 to 14 inches, very pale brown to pale-brown (10YR 7/3, dry; 6/3, moist) fine sandy loam; massive; soft when dry, very friable when moist; calcareous; boundary clear.

D 24 to 34 inches, light brownish-gray to pale-brown (10YR 6/2, dry; 6/3, moist), loose loamy fine sand stratified with fine and medium sand; calcareous.

The Chamokane soils vary somewhat in texture of the surface soil and subsoil and in the degree and kind of stratification of the substratum. The texture of the surface soil is dominantly fine sandy loam, but in some areas the surface soil is loam and silt loam and the upper subsoil is loam. The lower subsoil is more sandy than the upper subsoil and grades to loose, stratified sand or sand and gravel below a depth of 2 or 3 feet. A few small pieces of gravel are present throughout the soil.

Banks Series

Soils of the Banks series are sandy for their entire depth. They occupy flood plains, mainly along the Flathead River. They have developed in recently deposited, very sandy alluvium. The native vegetation on Banks soils is a fair to good cover of coarse grasses, shrubs, and evergreen and deciduous trees.

Bank soils are subject to frequent flooding, but between floods they are well drained down to the water table. When the river is low, the water table is from 4 to 10 feet below the soil surface, depending on the elevation of soil above the river.

These soils have been stabilized only a short time and have weathered little since the parent material was deposited. Only a small amount of organic matter has accumulated in the surface soil. Vegetation has had little effect on color or other characteristics of these soils. All layers are calcareous.

The Banks and Chamokane soils and Riverwash occupy most of the low bottom lands along the Flathead River. These bottom lands extend from near Kalispell north to where the river leaves the mountains. The Banks soils have lighter colored surface soil and upper subsoil and sandier lower subsoil than the Chamokane soils. The soils occupy slightly higher elevations, are more stable, and have a better vegetative cover than Riverwash.

Typical profile (Banks loamy fine sand, in NE¼NW¼, Sec. 35, Twp. 29N., Rge. 21W.):

$A_1$ 0 to 3 inches, grayish-brown to dark-brown (10YR 5/3.5, dry; 3/3, moist) loamy fine sand; weak, fine, crumb structure when moist, loose and single grained when dry; calcareous; boundary clear.

$C_1$ 3 to 17 inches, light brownish-gray to dark grayish-brown (10YR 6/2, dry; 4/2, moist) loamy fine sand; loose, single-grained; calcareous; boundary clear.

$C_2$ 17 to 30 inches, same as horizon above, but sand is medium and coarse and 5 to 10 percent of material is fine and medium gravel.

The slight reddish or brownish cast throughout the Banks soils is due to the reddish and brownish argillite and quartzite sand grains. The second layer in the profile varies considerably in thickness in short distances and from area to area. The loose, underlying sand occurs at depths ranging from 8 to 20 inches.

Banks loamy fine sand, 0 to 4 percent slopes (Ba). - This soil has the profile described for the Banks series. The soil is suitable only for pasture, and very little of it is cultivated. It is somewhat unstable under native vegetation and is cut and scoured by overflows. If plowed, the soil is likely to be washed away in places. Pastures could be improved by thinning brush and trees. This soil is in capability unit VIs-1.

## CAPABILITY UNIT IVs-1

Shallow to moderately deep, dark-colored, loamy, nearly level to gently rolling soils that are underlain by sand and gravel

Birch fine sandy loam, 0 to 5 percent slopes.
Chamokane and Banks soils, 0 to 4 percent slopes.
Kalispell gravelly loam, moderately deep over gravel, 3 to 7 percent slopes.
Kalispell gravelly loam, moderately deep over gravel, 7 to 12 percent slopes.
Kiwanis-Birch fine sandy loams, 0 to 5 percent slopes.
Kiwanis-Birch loams, 0 to 4 percent slopes.
Mires gravelly loam, 0 to 3 percent slopes.
Mires gravelly loam, 3 to 7 percent slopes.
Mires loam, 3 to 7 percent slopes.
Mires loam, 7 to 12 percent slopes.

These soils generally occur where rainfall is low in the Area. In addition, their texture and shallowness to strata of sand and gravel lower their capacity to hold moisture for plants. Their chief limitation, therefore, is droughtiness. The risk of erosion is slight.

These soils are suited best to grasses. If management is good, they can be used for hay or pasture. The desirable grasses eventually thin out and are replaced by weeds and by Bluegrass and other low-producing grasses. Before this occurs, the soil should be seeded to small grain for 1 or 2 years, and desirable grasses then reseeded in the grain stubble.

Grazing should be light or moderate. Some grass is irrigated by sprinklers to improve the vigor and yield of forage.

## CAPABILITY UNIT VIs-1

Mixed alluvial soils that are subject to flooding, droughtiness, and seasonal high water table

Alluvial land, well drained.

Banks loamy fine sand, 0 to 4 percent slopes.
Banks very fine sandy loam, 0 to 4 percent slopes.
Birch gravelly loam, 0 to 3 percent slopes.

These soils are generally along streams that are subject to overflow. Some of the acreage has been washed away through undercutting of stream banks.

The soils of this unit have a high water table part of the time, but in summer they are droughty. These areas should be cleared and developed as meadow or pasture. The best spots may be suitable for cultivation. Information as to the feasibility of clearing any areas of these soils for cultivation can be obtained from the county agricultural agent or the Soil Conservation District office.

Map Symbol Bb:

Banks very fine sandy loam, 0 to 4 percent slopes (Bb). - This soil is similar to Banks loamy fine sand, 0 to 4 percent slopes, except for texture of the surface soil. Most of this soil is subject to overflow from the river and is used for pasture. The amount and quality of forage could be improved by removing brush and thinning the trees.

Some of the higher lying, more stable acreage has been cleared and is used mainly for alfalfa, tame grasses, and garden vegetables. This soil is in capability unit VIs-1.

Banks Series

Soils of the Banks series are sandy for their entire depth. They occupy flood plains, mainly along the Flathead River. They have developed in recently deposited, very sandy alluvium. The native vegetation on Banks soils is a fair to good cover of coarse grasses, shrubs, and evergreen and deciduous trees.

Banks soils are subject to frequent flooding, but between floods they are well drained down to the water table. When the river is low, the water table is from 4 to 10 feet below the soil surface, depending on the elevation of soil above the river.

These soils have been stabilized only a short time and have weathered little since the parent material was deposited. Only a small amount of organic matter has accumulated in the surface soil. Vegetation has had little effect on color or other characteristics of these soils. All layers are calcareous.

The Banks and Chamokane soils and Riverwash occupy most of the low bottom lands along the Flathead River. These bottom lands extend from near Kalispell north to where the river leaves the mountains. The Banks soils have lighter colored surface soil and upper subsoil and sandier lower subsoil than the Chamokane soils. The soils occupy slightly higher elevations, are more stable, and have a better vegetative cover than Riverwash.

## CAPABILITY UNIT VIs-1

Mixed alluvial soils that are subject to flooding, droughtiness, and seasonal high water table

Alluvial land, well drained.
Banks loamy fine sand, 0 to 4 percent slopes.
Banks very fine sandy loam, 0 to 4 percent slopes.
Birch gravelly loam, 0 to 3 percent slopes.

These soils are generally along streams that are subject to overflow. Some of the acreage has been washed away through undercutting of stream banks.

The soils of this unit have a high water table part of the time, but in summer they are droughty. These areas should be cleared and developed as meadow or pasture. The best spots may be suitable for cultivation. Information as to the feasibility of clearing any areas of these soils for cultivation can be obtained from the county agricultural agent or the Soil Conservation District office.

TABLE 1. Soil Characteristics and Qualities Affecting Use and Source of Material for Soil Series in the Upper Flathead Valley Area, Montana, 1970.

| Soil Series | Physiographic Features | Soil Profile: Surface Layer | Soil Profile: Subsoil Layer | Soil Profile: Substratum | Soil Drainage: Water Table | Soil Drainage: Flooding Hazard | Soil Drainage: Surface Runoff | Soil Drainage: Drainage Class | Source of: Top Soil | Source of: Sand or Gravel | Source of: Road Fil |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Banks | Smooth low terraces of the flood plains which are dissected by braided stream channels. | 0 to 17", grayish brown, loamy fine sand or fine sandy loam | | 17 to 60", loose medium and coarse sand with small amounts of gravel | 3 to 10' except during period of flooding | Frequent | Very slow | Well drained between floods | Poor | Good if washed | Good |
| Chamokane | Nearly level to gentle irregular slopes of the low terraces and flood plains which are dissected by stream channels. | 0 to 7", dark grayish brown fine sandy loam, sandy loam or loam | 7 to 24", pale brown fine sandy loam that is weakly calcareous | 24 to 60" stratified loose loamy sand and sand with variable amounts of gravel. | 3 to 10' except during periods of flooding | Frequent | Slow | Mod.well drained | Fair to 8 or 10" | Fair for Sand if washed | Good |

TABLE 2 Estimated Physical & Chemical Properties of Soils Upper Flathead Soil Survey Area, Montana 1970

| Soil Series and Map Symbols | Depth to: Bedrock, gravel, etc. (inches) | Depth to: Seasonal Water Table (Feet) | Depth from Surface (inches) | Classification: USDA Texture | Classification: Unified | Classification: AASHO | Percentage larger than 3 inches | Percentage passing sieve: No.4 | No.10 | Mo.40 | No.200 | Permeability Inch. per hour | Avail-Water Cap. Inches per inch of Soil | Reaction pH | Salinity mm-hos /cm | Shrink-Swell Potential | Frost Action Potential | Corrosivity: Untreated Steel | Corrosivity: Concrete |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Banks (Ba,Bb) | 30 to 60 (gravel) | 3 to 10 | 0 to 17 | Loamy fine sand | SM | A-2-4 | 0 to 1 | 95-100 | 95-100 | 65-80 | 20-35 | 2.0-6.3 | .06-.10 | 7.9-8.4 | 0-2 | Low | Low | Low | Low |
| | | | 17 to 60 | Med.& Coarse Sand | SP-SM | A-1 | 0 to 2 | 85-100 | 85-100 | 50-70 | 5-10 | 6.3-20 | .03-.06 | 7.9-8.4 | 0-2 | Low | Low | Low | Low |
| Chamokane (Ca,Cb, Cc) | 36 to 60 (gravel) | 3 to 10 | 0 to 24 | Fine Sandy Loam | SM or ML | A-4 | 0 to 1 | 95-100 | 90-100 | 60-80 | 40-60 | 2.0-6.3 | .10-.14 | 7.9-8.4 | 2-4 | Low | Mod | Low | Low |
| | | | 24 to 60 | Loamy Fine Sand | SM | A-2-4 | 0 to 2 | 90-100 | 75-100 | 50-70 | 15-35 | 2.0-6.3 | .06-.10 | 7.9-8.4 | 2-4 | Low | Mod | Low | Low |

TABLE 3. Estimated Soil Limitations or Suitabilities for Selected Uses in Urban Planning and Development - Upper Flathead Valley Area

Note: These interpretations will not eliminate the need for on-site soil investigations for design & construction.

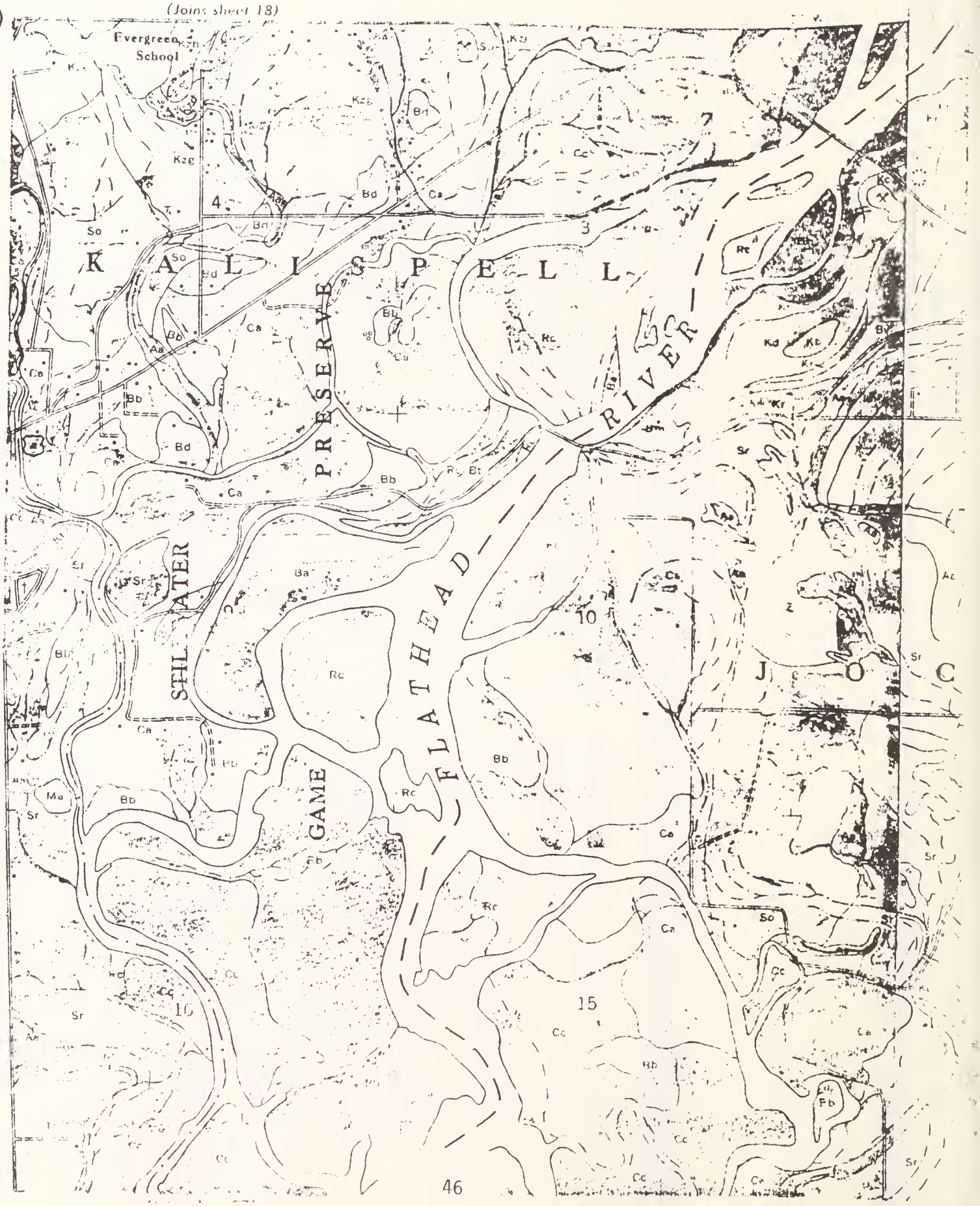
| Map ping Unit | Soil Name and Phase | Slope Range | Bldg. Sites Resi-dential | Roads and Parking | Lawns and Landscaping | Intensive Play Areas | Picnicking and Camping | Sanitary Land Fills | Ceme-teries | Sewage Disposal | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Septic Tank Use | Lagoons | |
| | | | | | | | | | | | Ponds | Embankment |
| Bb | Banks very fine sandy loam | 0-4 | Severe 1 | Severe 1 | Severe 1 | Mod.1,17 | Mod. 1,17 | Severe 1,2, 16 | Severe 1,2 | Severe 1,16 | Severe 11,16 | Severe 6,11, 19 |
| Cc | Chamokane & Banks soils | 0-4 | Severe 1 | Severe 1 | Severe 1 | Mod.1,17 | Mod.1,17 | Severe 1,2, 16 | Severe 1,2 | Severe 1,16 | Severe 11,16 | Severe 6,11, 19 |

Appendix 1 cont

Constancy and (Average Coverage %)
of Important Plants in Montane Subalpine Habitat Types and Phases

| | PSEUDOTSUGA MENZIESII CLIMAX SERIES | | | | | | | | PICEA CLIMAX SERIES | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OF/Caru h.t. | | | OF/Cagr h.t. | OF/Aphe h.t. | OF/Arun h.t. | OF/Junc h.t. | OF/Arco h.t. | S/Eqar h.t. | S/Clun h.t. | | S/Phma h.t. | B/Gatr h.t. | S/Vasc h.t. |
| | Agsp phase | Aruv phase | Caru phase | | | | | | | Clun phase | Vasc phase | | | |
| No. of Stands | 10 | 11 | 70 | 10 | 11 | 6 | 14 | 11 | 9 | 16 | 8 | 6 | 15 | 4 |
| **TREES** | | | | | | | | | | | | | | |
| Pinu flex | -( 0) | -( 0) | +(10) | 1(15) | 2( 1) | 6( 3) | 4( 0) | 3( 5) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Pinu pond | 10(45) | 10(36) | 3(21) | 3(13) | 5(27) | 10(32) | 3( 8) | 2( 8) | -( 0) | 1( 8) | 4( 5) | -( 0) | 1(39) | 2(15) |
| Pseu penn | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Pseu menz | 10(18) | 10(26) | 10(57) | 10(74) | 10(60) | 10(43) | 10(32) | 10(63) | 4( 1) | 8(19) | 8(11) | 10(50) | 7(19) | 8(11) |
| Pinu cont | 1( 0) | 9( 8) | 5(21) | 3( 1) | 3( 5) | 1(15) | 9(31) | 1( 3) | 6( 5) | 4(22) | 10(21) | 3(25) | 6(19) | 10(34) |
| Lari occi | -( 0) | 3( 1) | 1(11) | -( 0) | 2( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 7(20) | 6( 7) | -( 0) | -( 0) | 8(13) |
| Pinu mont | -( 0) | 1( 3) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 3) | 3( 2) | -( 0) | -( 0) | -( 0) |
| Pice glau | -( 0) | -( 0) | +( 1) | 1( 1) | 1( 0) | 1( 1) | 1( 0) | -( 0) | 6(71) | 8(32) | 6(21) | 5(18) | 3(53) | 6(11) |
| Pice engе | -( 0) | -( 0) | +( 0) | -( 0) | -( 0) | -( 0) | 1( 2) | 1( 3) | 4(79) | 3(33) | 3(39) | 5(26) | 7(58) | 4(14) |
| Betu papy | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 2( 9) | 3(20) | -( 0) | -( 0) | -( 0) | -( 0) |
| Abie gran | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 1) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Thuj plic | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 3) | -( 0) | -( 0) | -( 0) | -( 0) |
| Taxu bacc | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Abie lasi | -( 0) | -( 0) | 1( 1) | 4( 1) | -( 0) | -( 0) | 1( 0) | 1( 0) | 2( 0) | 3( 2) | 6( 1) | 7( 5) | 5( 1) | 2( 1) |
| Taxu mert | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Pinu albi | -( 0) | 1( 0) | 1( 3) | 2(20) | -( 0) | 1( 1) | 1(15) | -( 0) | -( 0) | -( 0) | -( 0) | 2( 0) | 3( 0) | -( 0) |
| Lari lyal | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| **SHRUBS AND SUBSHRUBS** | | | | | | | | | | | | | | |
| Acer glab | 7( 1) | 6( 1) | 3( 1) | 1(15) | 8( 3) | 6( 1) | -( 0) | 1( 1) | 4( 1) | 9( 6) | 10( 5) | 3( 2) | 5( 3) | 8( 8) |
| Arct trid | -( 0) | -( 0) | +( 1) | -( 0) | -( 0) | 3( 1) | -( 0) | 2( 1) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Holo diac | 1( 1) | -( 0) | +( 1) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Junі comm | -( 0) | 2( 1) | 3( 6) | 7( 5) | 5( 1) | 9(15) | 10(27) | 8( 5) | 3( 1) | 1( 1) | 6( 8) | 3( 2) | 3( 1) | 4( 2) |
| Junі hori | -( 0) | 1( 0) | -( 0) | -( 0) | -( 0) | 1( 3) | 1(19) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Ledu glan | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 1) | -( 0) |
| Mahо ferr | -( 0) | 1( 1) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 1) | 3( 1) | -( 0) | -( 0) | -( 0) |
| Oplo horr | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Pach myrs | -( 0) | 1( 1) | +( 2) | 1( 3) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 3( 1) | 1( 3) | -( 0) | 1( 1) | -( 0) |
| Phyl empe | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Phys malv | 3( 1) | 1( 1) | 1( 2) | 2( 2) | -( 0) | 3( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 10(66) | 10(66) | 1( 1) | -( 0) |
| Prun virg | 1( 1) | -( 0) | 1(13) | -( 0) | 1( 1) | -( 1) | 2( 2) | 2( 1) | -( 0) | 1( 9) | 1( 1) | 5( 2) | 1( 2) | -( 0) |
| Pure trid | 2( 9) | -( 0) | +( 3) | -( 0) | 1( 1) | 1(15) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Ribe lacu | -( 0) | -( 0) | 1( 1) | 1( 1) | 1(15) | 1( 1) | -( 0) | 3( 1) | 8( 1) | 3( 1) | -( 0) | 2( 1) | 9( 2) | -( 0) |
| Ribe mont | -( 0) | -( 0) | -( 0) | 1( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Rubu parv | -( 0) | -( 0) | +( 3) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 3) | 4( 9) | 3( 1) | 5( 0) | 4(16) | -( 0) |
| Shep cana | -( 0) | 5( 3) | 2( 2) | -( 0) | 5( 1) | 6( 2) | 8( 1) | 1( 0) | 2( 1) | 4( 0) | +( 5) | 3( 1) | 4( 4) | 4( 1) |
| Spir beau | 5( 5) | 7( 9) | 9( 5) | 8( 4) | 10(27) | 6( 8) | 9( 6) | 4( 2) | 2( 2) | 7(13) | 9(15) | 10( 3) | 5( 9) | 8( 8) |
| Symp albu | 5( 2) | 6( 2) | 5( 2) | 7( 3) | 5( 1) | 9( 1) | 6( 2) | 2( 1) | 7( 1) | 9(10) | 10( 9) | 10( 5) | 8(12) | 4( 9) |
| Taxu brev | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 1) | 1( 1) | -( 0) | -( 0) | -( 0) |
| Vacc caes | -( 0) | 1( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 2) | 10( 9) | -( 0) | -( 0) | 10(12) |
| Vacc glob | -( 0) | 2( 2) | 1( 3) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 1) | 1( 8) | 3(19) | 2( 1) | 1( 3) | 2( 1) |
| Vacc myrt | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 1) | -( 0) | -( 0) | -( 0) | 4( 5) |
| Vacc scop | -( 0) | 3( 1) | 1( 8) | -( 0) | -( 0) | -( 0) | 1( 0) | -( 0) | 2( 1) | 2( 1) | 3( 8) | -( 0) | 1( 3) | 2( 1) |
| Arct uva- | 3( 5) | 10(37) | 3(13) | -( 0) | 3( 1) | 10(20) | 7( 1) | 1( 3) | -( 0) | 2( 1) | 8( 5) | -( 0) | -( 0) | 8( 1) |
| Berb repe | 3( 1) | 5( 1) | 7( 2) | 8( 1) | 6( 1) | 8( 1) | 6( 5) | 5( 1) | 4( 1) | 8( 5) | 10( 8) | 7( 1) | 7( 6) | 8( 5) |
| Linn bore | -( 0) | 1( 1) | 1( 1) | 1( 1) | -( 0) | -( 0) | 1( 1) | -( 0) | 4( 2) | 9(12) | 10(20) | 2(15) | 5(28) | 8( 8) |
| **FERNS & FERN ALLIES** | | | | | | | | | | | | | | |
| Athy fili | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 2( 2) | 1( 1) | -( 0) | -( 0) | 1( 2) | -( 0) |
| Equi arve | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 10(40) | 2( 5) | 3( 1) | -( 0) | 6( 3) | 2( 1) |
| Gymn dryo | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 2( 1) | -( 0) | -( 0) | -( 0) | -( 0) |
| **GRAMINOIDS** | | | | | | | | | | | | | | |
| Agro scab | -( 0) | -( 0) | +( 1) | -( 0) | -( 0) | -( 0) | 1( 1) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Agro spic | 9(11) | 4( 2) | 2( 1) | 1( 1) | 4( 8) | 8( 1) | 4( 1) | 5( 1) | -( 0) | -( 0) | -( 0) | 2( 1) | -( 0) | -( 0) |
| Cale cana | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 1) | -( 0) | -( 0) | -( 0) | 2( 2) | -( 0) |
| Cala rube | 10(28) | 10(25) | 10(44) | 5( 2) | 6( 2) | 3( 1) | 3( 2) | 3( 0) | 3( 1) | 5( 9) | 9(22) | 5( 1) | 5(15) | 10(36) |
| Care geye | 7(23) | 5(10) | 6(11) | 9(44) | 5( 2) | 1( 1) | 4( 2) | 4( 1) | -( 0) | -( 0) | 1( 1) | 7(17) | 1( 2) | -( 0) |
| Feat idah | 8( 9) | 5( 8) | 2( 1) | 4( 1) | 5( 4) | 6( 3) | -( 0) | 7( 2) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Feat occi | 3( 6) | 2( 8) | 2( 1) | 1( 1) | 3( 2) | 5( 4) | 1( 1) | 2( 1) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Hoop hing | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 1) | -( 0) | 1( 1) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Luzu hitc | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Oryz aspe | -( 0) | -( 0) | +( 3) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 8( 2) | 6( 2) | -( 0) | 2( 1) | 2( 1) |
| Schi purp | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 1) | -( 0) | -( 0) | 1( 1) | -( 0) |
| **FORBS** | | | | | | | | | | | | | | |
| Acta rubr | -( 0) | -( 0) | +( 1) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 3( 1) | 1( 1) | 3( 1) | 5( 1) | 10( 1) | -( 0) |
| Adox bico | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 4( 1) | -( 0) | -( 0) | -( 0) | -( 0) |
| Aral mudi | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 3) | 7(19) | -( 0) | -( 0) | -( 0) | -( 0) |
| Aral cord | 5( 2) | 5( 4) | 9(14) | 9(23) | 6( 8) | -( 0) | 7( 4) | 9(26) | 1( 1) | 1( 3) | 4( 1) | 3( 2) | 5( 6) | 8( 1) |
| Aral lati | -( 0) | -( 0) | 1(10) | -( 0) | 1( 3) | -( 0) | -( 0) | 1( 1) | 1( 3) | 3(17) | 3( 8) | -( 0) | 1( 1) | 2( 1) |
| Bale aagl | 9( 9) | 2( 1) | 2( 1) | 5( 1) | 5( 6) | 8( 3) | 2( 1) | 1( 1) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 1) | -( 0) |
| Clem pacu | -( 0) | -( 0) | -( 0) | 1( 3) | -( 0) | 5( 0) | 2( 1) | 1( 1) | -( 0) | -( 0) | -( 0) | 2( 1) | 1(15) | -( 0) |
| Clem tanu | -( 0) | -( 0) | -( 0) | 1( 1) | -( 0) | -( 0) | 1( 1) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Clin unif | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 6( 3) | 9( 3) | -( 0) | -( 0) | -( 0) |
| Copt occi | -( 0) | -( 0) | +( 3) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Core cana | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 3( 1) | 8( 5) | 9( 9) | -( 0) | -( 0) | -( 0) |
| Disp trac | -( 0) | 1( 1) | 2( 1) | 2( 1) | 2( 1) | 1( 1) | 4( 1) | 3( 1) | -( 0) | 5( 1) | 3( 1) | 10( 1) | 6( 1) | 2( 1) |
| Gali bore | 1( 0) | -( 0) | 3( 1) | 5( 1) | 5( 1) | 6( 1) | 5( 1) | 3( 1) | 6( 1) | 6( 1) | 8( 1) | 10( 1) | 3( 1) | 6( 1) |
| Gali trif | -( 0) | -( 0) | +( 0) | -( 0) | -( 0) | 1( 1) | -( 0) | -( 0) | 9( 1) | 7( 3) | 5( 1) | 10( 1) | 10( 2) | -( 0) |
| Gera rich | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 1) | 7( 1) | -( 0) | -( 0) | 5( 1) | 6( 5) | -( 0) |
| Hier grac | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Osmo chil | -( 0) | 1( 1) | 3( 1) | 7( 1) | 1( 1) | 1( 1) | 1( 1) | 4( 1) | 6( 1) | 7( 2) | 8( 1) | 8( 1) | 9( 1) | 2( 1) |
| Pyro asar | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 6( 1) | 4( 0) | -( 0) | -( 0) | 3( 1) | -( 0) |
| Pyro secu | -( 0) | -( 0) | 3( 1) | 1( 1) | 3( 1) | -( 0) | 4( 1) | 3( 1) | 6( 1) | 5( 1) | 6( 1) | 8( 1) | 8( 2) | 2( 1) |
| Pyro unif | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 2( 1) | -( 0) | -( 0) | -( 0) | 2( 0) | -( 0) |
| Sene atra | -( 0) | -( 0) | 1( 1) | -( 0) | 1( 1) | -( 0) | 1( 1) | 2( 1) | -( 0) | -( 0) | -( 0) | -( 0) | 1( 1) | -( 0) |
| Sene tria | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 4( 0) | -( 0) | -( 0) | -( 0) | 5( 1) | -( 0) |
| Smil race | -( 0) | 1( 1) | 5( 1) | 6( 1) | 4( 1) | 1( 1) | 2( 1) | 2( 1) | 1( 1) | 3( 1) | 4( 1) | 7( 1) | 5( 1) | -( 0) |
| Smil stel | -( 0) | -( 0) | 1( 1) | 2( 1) | 1( 1) | 6( 1) | 3( 1) | 1( 1) | 10( 3) | 7( 3) | 6( 1) | 7( 1) | 8( 1) | 2( 1) |
| Stre ampl | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 4( 4) | 1( 3) | 1( 1) | -( 0) | 6( 1) | -( 0) |
| Thal occi | -( 0) | -( 0) | 5( 6) | 7( 5) | 5( 1) | 3( 1) | 5( 3) | 2( 5) | 7( 2) | 8( 1) | 6( 4) | 10( 1) | 7( 3) | 4( 1) |
| Tiar trif | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | 2( 1) | 1( 1) | -( 0) | -( 0) | -( 0) |
| Trai lasu | -( 0) | -( 0) | -( 0) | -( 0) | - | | | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Vale sitc | -( 0) | 1( 1) | +( 1) | 1( 1) | - | | | 1( 1) | 1( 1) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Vera viri | -( 0) | -( 0) | -( 0) | -( 0) | - | | | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) | -( 0) |
| Viol cane | -( 0) | -( 0) | +(15) | -( 0) | | | | -( 0) | 5( 1) | 4( 1) | 5( 1) | 5( 3) | 3(10) | -( 0) |
| Viol orbi | -( 0) | -( 0) | -( 0) | -( 0) | | | | -( 0) | 1( 1) | 5( 3) | 8( 1) | 2( 1) | 1( 3) | 2( 1) |
| Xero tena | -( 0) | 1( 1) | 1( 1) | 1( 1) | | | | -( 0) | -( 0) | 1( 1) | 3(19) | -( 0) | -( 0) | -( 0) |

UPPER FLATHEAD VALLEY



[illegible]/[illegible]
(S/Eqar, spruce/common horsetail)

The S/Eqar [illegible] is a very localized [illegible] type of wet bottomlands and lowlands and is somewhat comparable topographically and edaphically to the [illegible] h.t. of northwestern Montana. It usually develops on flat sites with poor drainage, such as broad alluvial valley bottoms, beaver ponds, old stream beds, and glacial kettles. On some of these sites thick layers of organic muck have developed. On others the substrate is composed of fine alluvium, often with heavy surface layers of organic matter. Soils are probably highly acidic, water permeates the soil throughout most of the year, and surface water is often present.

In general the habitat type is rare, but it becomes abundant locally, especially in the Little Belt Mountains along drainages such as Sheep Creek (along Highway 89 north of White Sulfur Springs). It was found at elevations of 2900-3600 feet in northwest Montana and ranged from 5300 to 6800 feet on national forests east of the Continental Divide.

Picea (principally hybrids) is essentially the only successful coniferous tree species. High water tables allow other conifers to succeed only on relatively dry hummocks. Populus spp. or Betula papyrifera may be abundant in seral stands.

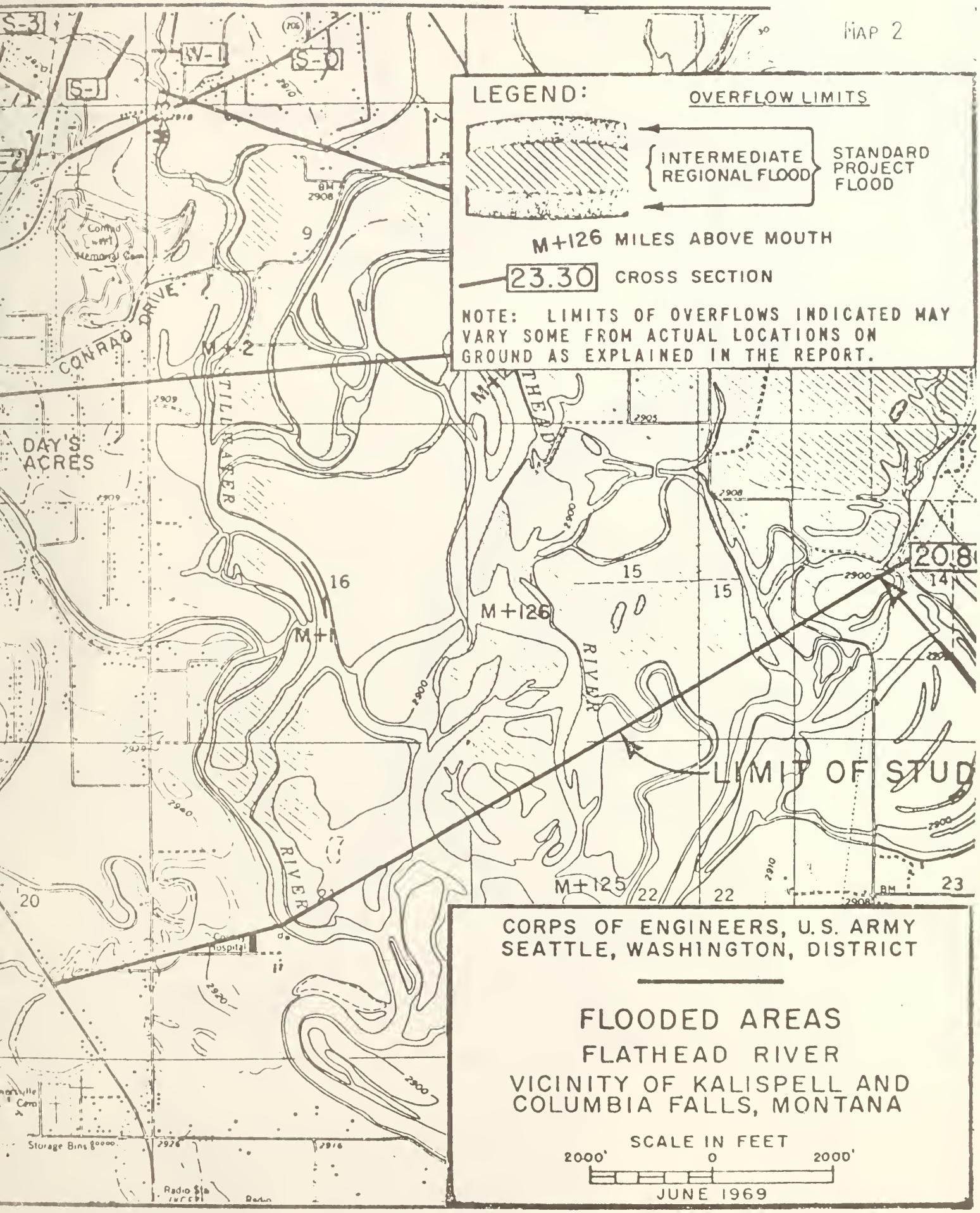
The undergrowth normally is dominated by Equisetum spp. and wet site forbs and graminoids. Several variations in composition have been observed on sample plots. Equisetum arvense was abundant in seven out of nine sample stands while E. scirpoides dominated another. In the Flathead Lake vicinity one stand had Lysichitum americanum abundant while another had both Lysichitum and Equisetum arvense abundant. All three species typify the environment of S/Eqar. Cornus stolonifera, Ribes lacustre, and Rosa acicularis are shrubs commonly associated with the undergrowth. Other frequent species are Carex spp., Galium triflorum, Geranium richardsonii, Senecio triangularis, Smilacina stellata, Geum macrophyllum, and Streptopus amplexifolius. Athyrium filix-femina, Rubus pubescens, Cornus canadensis and Viola canadensis were found often in northwestern but not in central and south-central Montana stands.

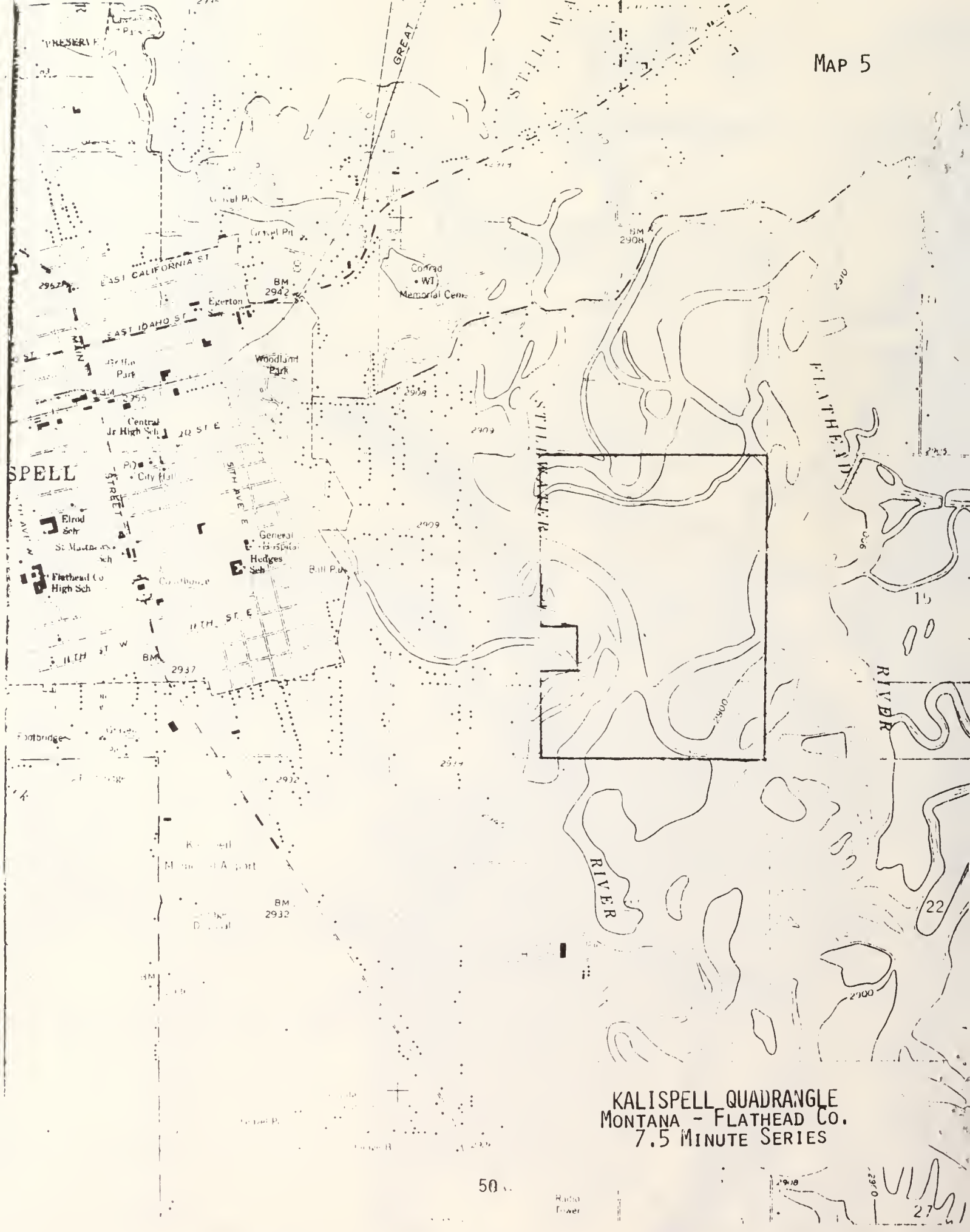
Ogilvie (1962) describes two similar Picea h.t.s for the northern Rocky Mountains in Alberta. His Picea glauca/Equisetum h.t. appears similar to our variation occuring on alluvial silts. The Picea glauca/Sphagnum-Ledum groenlandicum h.t. occurs on acid peat accumulations much like our variant on deep organic soils; however, our shrub layer is less developed. Ogilvie does not describe any situation similar to our Lysichitum variant.

Adjacent habitat types are normally other members of the Picea [illegible] on upland sites and Salix, Carex, or Typha bogs on wetter sites.

S/Eqar is a productive habitat for spruce but other conifers are absent. Overstory manipulation requires special constraints in deference to the wet bottom situations and potential windthrow in residual trees. Road construction and site development present problems related to high water tables, poor drainage, streamside locations, and organic soils.

Use by big game and domestic stock is variable. In general it appears they avoid this habitat during periods of peak soil saturation but may make some use as soils dry out in late summer. Some stands showed moderate winter use by whitetail deer, elk, and moose.


LEGEND:
OVERFLOW LIMITS
INTERMEDIATE REGIONAL FLOOD
STANDARD PROJECT FLOOD
M+126 MILES ABOVE MOUTH
23.30 CROSS SECTION
NOTE: LIMITS OF OVERFLOWS INDICATED MAY VARY SOME FROM ACTUAL LOCATIONS ON GROUND AS EXPLAINED IN THE REPORT.
CONRAD DRIVE
STILLWATER RIVER
FLATHEAD RIVER
DAY'S ACRES
M+126
M+125
LIMIT OF STUD
20.8
CORPS OF ENGINEERS, U.S. ARMY
SEATTLE, WASHINGTON, DISTRICT
FLOODED AREAS
FLATHEAD RIVER
VICINITY OF KALISPELL AND COLUMBIA FALLS, MONTANA
SCALE IN FEET
2000' 0 2000'
JUNE 1969


MAP 5
KALISPELL QUADRANGLE
MONTANA - FLATHEAD CO.
7.5 MINUTE SERIES
EAST CALIFORNIA ST
EAST IDAHO ST
Woodland Park
Central Jr High Sch
Flathead Co High Sch
Hedges Sch
General Hospital
City Hall
Courthouse
Ball Park
Conrad Memorial Cem
BM 2942
BM 2908
BM 2937
BM 2932
STILLWATER
FLATHEAD
RIVER
GREAT
SPELL

# OWEN SOWERWINE STATE NATURAL AREA MANAGEMENT MAP